

May 14, 2004

Inquiry into Building Construction Energy
Efficiency Standards

NOTICE OF INQUIRY

WELCH, Chairman; DIAMOND and REISHUS, Commissioners

I. SUMMARY

By way of this Notice, the Maine Public Utilities Commission (Commission) initiates an Inquiry into issues that must be resolved before developing a major substantive rule that will establish a model building energy code for Maine, as required by P.L. 2003 ch. 645. At a minimum, we will investigate the integration of efficiency and ventilation standards, the applicability of codes to manufactured housing and residential renovations, and the appropriate means of retaining consistency between energy codes and other State building codes.

II. BACKGROUND

A. Building Codes Established by Law in 2004

During 2004, the Legislature enacted two laws that change building codes in Maine.¹ The first, the Building Code Act, establishes a variety of building codes that must be observed in Maine, but does not establish energy codes. The second, the Energy Code Act, addresses energy codes.

The Building Code Act contains the following requirements:

- Maine's building codes shall be the International Residential Code (IRC)® and the International Building Code (IBC)®, which define standards in such areas as building design, construction material, fuel and water systems, and fuel burning systems.² These codes are applicable to virtually all types of buildings.
- Each municipality shall decide whether or not to adopt building codes, but if it adopts codes, it must adopt the IRC and the IBC.

¹ P.L. 2003, ch. 580, "the Building Code Act", and P.L. 2003, ch 645, "the Energy Code Act." They may be found on the Commission's web page:

www.state.me.us/mpuc/2004legislation/buildingcodes.htm.

² The IBC and IRC are members of a larger family of codes called the I-Codes. The I-Codes are developed by the International Code Council (ICC), an organization that establishes widely-used, comprehensive building standards. I-Codes may be obtained through ICC's web site: <http://www.iccsafe.org>.

The municipality may amend portions of the codes as long as it does not adopt a different code in its entirety.

- Certain codes currently required by law supersede conflicting portions of the IRC or IBC (for example, fire safety, electric, and plumbing codes).
- A building code already adopted by a municipality is grandfathered.

The Energy Code Act contains the following requirements:

- Maine's energy codes shall be "consistent with" other model building codes in Maine. The Commission is charged with clarifying what the energy codes shall be, subject to the requirements contained in the law.
- Maine's codes must include ventilation standards.
- Each municipality shall decide whether or not to adopt energy codes, but if it adopts codes, it must adopt the energy codes established by the Commission.
- Maine's energy codes must not be inconsistent with fire, plumbing, and certain other related codes.
- An energy code already adopted by a municipality is grandfathered.

Additional background on energy codes is provided in the Commission's two reports: "Final Report on Building Energy Codes" and "Report on Above-Code Building Energy Guidelines," submitted to the Legislature on January 26, 2004.

B. Building Energy Codes in Existence before 2004

Other provisions of Maine law, enacted before 2004, govern energy efficiency standards that must be attained by building construction in Maine:³

- New construction and substantial renovation of multifamily structures and of commercial or institutional buildings must conform to ASHRAE 90.1-2001 energy requirements and ASHRAE 62-2001 ventilation standards.⁴ The Energy Code Act expands upon this requirement by allowing compliance with the 2003 edition of the International Energy Conservation Code (IECC)® to constitute compliance with this law.⁵

³ See 10 M.R.S.A. Chapter 214, but observe that the Energy Code Act modifies many portions of Chapter 214.

⁴ ASHRAE is the American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc., an organization that establishes widely-used building standards. The standards may be found at ASHRAE's web site, www.ashrae.org.

⁵ See Subsections 1415-C(3) and 1415(D) of Title 10.

- Publicly subsidized, multifamily, residential housing heated with electricity must attain minimum R-values established in Maine law.⁶ Before 2004, Maine law required residential spec-built homes to attain prescribed R-values, but that law was repealed in 2004.

C. Enforcement of Building Energy Codes

Maine law establishes procedures for enforcing Maine's building energy standards.⁷ In recent years, these procedures have generally been disregarded. The Energy Code Act seeks to remedy this lack of enforcement by requiring the Commission to investigate enforcement models and submit its findings to the Legislature in 2005. The Commission's investigation of enforcement procedures will take place separately from this Inquiry.

III. DISCUSSION

The Energy Code Act requires the Commission to define the energy efficiency and ventilation components of the larger family of building codes established through the Building Code Act, in a manner consistent with those building codes. Specifically, the Building Code Act states:

The commission shall adopt by rule a model building energy code, including a ventilation code, that is consistent with any other model building codes adopted by the State and with the building energy standards established in Title 10, section 1415-C, subsection 3 and section 1415-D. The commission shall ensure that the model code is not inconsistent with any other applicable state code or standard, including, but not limited to, any fire safety code, plumbing code, oil and solid fuel equipment standard, propane and natural gas equipment standard or boiler and pressure vessel standard.

Thus, absent a strong showing to the contrary, to satisfy the consistency requirements of the law, the energy and ventilation components of Maine's model building energy code should be part of the same family of codes, apply to the same types of buildings, include similar exemptions, and be adoptable in the same manner as the building codes established in the Building Code Act.

In the following sections, we discuss our current view of a model building energy code that complies with this requirement. In Section V, we will pose questions to interested persons on these topics.

⁶ See Subsection 1415-G of Title 10.

⁷ See Subsection 1415-E of Title 10.

A. Appropriate Standards

The Building Code Act establishes the IBC and the IRC as the core of Maine's building codes, but explicitly does not adopt codes referenced in the IBC and IRC. However, the Energy Code Act requires the energy codes to be consistent with other adopted codes, and the IBC and IRC adopt the International Energy Conservation Code (IECC®) as energy efficiency standards⁸ (revisions to the energy efficiency standards in the IRC are being considered as this Notice is written). The IECC in turn adopts ASHRAE 90.1 as the standard for non-residential buildings,⁹ while also describing additional prescriptive measures of compliance.¹⁰ The consistency mandate would seem to militate strongly in favor of requiring that the IECC be Maine's building energy code.

The Energy Code Act states that if any portions of the IECC are inconsistent with any other state code or standard such as fire or plumbing codes, the Commission must resolve the conflict. In Section V, we seek input on the areas of conflict.

Diagrams describing certain basic features of the IECC are in the Appendices to this Notice.

The Building Code Act requires that the model energy code include a ventilation code. The IECC, the IRC, and the IBC do not contain explicit ventilation or indoor air quality standards. Maine law adopts ASHRAE 62-2001 ventilation standards for commercial and institutional building construction, but is silent regarding residential and industrial ventilation standards. We are inclined to adopt the ASHRAE 62.2-2003 ventilation standards for residential construction as part of the Maine model energy code. In Section V, we seek input on whether this ventilation code will adequately protect the quality of indoor air when combined with the IECC energy efficiency requirements. In addition, we are inclined to adopt ASHRAE 62-2001 ventilation standards for industrial buildings, and invite comment on this proposal.

B. Applicability

1. Residential building processes. Statutory residential construction standards that have existed in recent years governed only building envelope construction. However, in addition to envelope standards, the IECC standards apply to water heating systems, mechanical systems, and lighting. Thus, adoption of the IECC as a model code expands construction requirements significantly for residential construction.

⁸ See Section N1101.2.1 in the IRC manual and Section 1301.1 in the IBC manual.

⁹ See Section 701.1 of the 2003 IECC manual.

¹⁰ See Sections 801 and following of the 2003 IECC manual.

2. Commercial and institutional building processes. As stated above, statutory commercial and institutional construction standards currently require compliance with ASHRAE 90.1-2001, and the IECC adopts ASHRAE 90.1 as well as offering alternative, prescriptive standards. Thus, adoption of the IECC for commercial and institutional buildings will not expand construction requirements but will allow more options for compliance,

3. Types of residential buildings. Statutory residential construction standards that have existed in recent years did not apply to construction of single-family residences built by or for the owner to be his/her own residence, to renovation of single-family dwellings, or to log cabins. Thus, only a small portion of residential construction in Maine (so-called spec built homes) has been required to conform to statutory efficiency standards. The standards adopted through the IRC apply to “detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories in height with a separate means of egress and their accessory structures.”¹¹ However, the IECC exempts from building envelope codes (but not the remaining energy codes) buildings that are separated from the remainder of the building, that have a low design rate of energy usage, or that are neither heated nor cooled.¹² To attain consistency with the Building Code Act, as required by the Energy Code Act, Maine’s model building energy code must be applicable to the group of residential buildings to which the IRC is applicable, with the exception of the exemptions defined in the IECC. Thus, virtually all residential construction (in towns that adopt standards) will be subject to efficiency standards.

The IRC and the IECC do not explicitly address modular and manufactured homes.¹³ We are aware that building standards developed by the federal Department of Housing and Urban Development govern the construction of some manufactured homes and standards developed by Maine’s Manufactured Housing Board govern the construction of modular homes.¹⁴ The Commission does not currently have a view on the appropriate treatment of manufactured housing (including modular).

As discussed earlier, current Maine law establishes building envelope standards for publicly subsidized, multifamily, residential housing heated with electricity. It appears that this would result in these structures being subject to the IECC in all areas except building envelope standards. We do not have a view as to whether treating this type of housing differently is desirable. While the law is clear that it should be, we invite interested persons to comment on whether the resulting

¹¹ See Section R101.2 of the 2003 IRC manual.

¹² See Section 101.2.1 of the 2003 IECC manual.

¹³ 10 M.R.S.A. §9002 and 30-A §4358 generally define “manufactured housing” as so-called “HUD-code homes” or “newer mobile homes,” so-called “modular homes” that are manufactured according to Maine’s Manufactured Housing Act, and units constructed prior to mid-1976.

¹⁴ 10 M.R.S.A. §9001 through §9090, comprise Maine’s Manufactured Housing Act.

inconsistency should be eliminated by revising Maine law to remove the existing envelope requirements for this housing group.

4. Renovations and additions. The IRC standards apply to “the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition” of residential buildings.¹⁵ The IBC applicability term is similarly worded.¹⁶ Similarly, the IECC states: “Additions, alterations, renovations or repairs to a building envelope, mechanical, service water-heating, electrical distribution or illumination system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portions(s) of the existing system to comply with all of the requirements of this code.”¹⁷ In our view, these provisions make it clear that the Maine model energy code should apply to renovations and additions, as well as to new construction.

As an alternative, the IRC, IBC, and IECC also allow renovations and additions to follow standards contained in the International Existing Building Codes (IEBC®), a standard developed specifically for construction on existing buildings. The IRC, IBC, and IECC state: “(e)xisting buildings undergoing repair, alteration or additions, and change of occupancy shall be permitted to comply with the *International Existing Building Code*.”¹⁸

5. Change of occupancy. The IRC, IBC, and IECC do not require that a building be retrofitted to meet code when a change of occupancy occurs. Thus, existing buildings appear to be grandfathered until renovations or additions occur, at which time upgrade to IECC standards is required.

6. Industrial buildings. Current statutory standards apply to “any commercial or institutional building,” implicitly excluding industrial buildings.¹⁹ However, the IBC is applicable to all non-residential buildings,²⁰ and the IECC does not appear to exclude industrial buildings from its standards for “commercial buildings.”²¹ Thus, in our view, the model building energy code must apply to industrial buildings.

C. Voluntary vs. Mandatory Standards

The Building Code Act and the Energy Code Act establish a so-called “voluntary” code adoption model, in that they allow each municipality to choose

¹⁵ See Section R101.2 of the 2003 IRC manual.

¹⁶ See Section 101.2 of the 2003 IBC manual.

¹⁷ See Section R101.2.2.2 of the 2003 IECC manual.

¹⁸ See Section R101.2 of the 2003 IRC manual, Section 101.2 of the 2003 IBC manual, and Section 101.2 of the 2003 IECC manual.

¹⁹ See definitions at 10 M.R.S.A. §1413.

²⁰ See section 101.2 of the 2003 IBC manual.

²¹ See generally Chapters 7 and 8 of the 2003 IECC manual.

whether to adopt codes.²² The Building Code Act also allows a municipality to adopt only portions of the IRC or IBC and to amend the codes it adopts (subject to some limitations). In addition, both Acts grandfather existing municipally adopted building codes.²³ Specifically, the Building Code Act states:

A town, city or municipality may not adopt a residential building code or nonresidential building code other than the Maine Model Building Code after the effective date of this chapter. A town, city or municipality that adopts the Maine Model Building Code may adopt amendments to the code at any time, as long as such an amendment does not result in the adoption of all or a significant portion of any code other than the code adopted pursuant to this section. This section may not be construed to prevent a town, city or municipality from selectively adopting parts or portions of the Maine Model Building Code or from adopting a building rehabilitation code.

The Energy Code Act has a similar but not identical provision:

After the effective date of rules adopted pursuant to subsection 1, a municipality may not adopt a building energy code other than the model building energy code. Nothing in this section requires a municipality to adopt a building energy code.

To maintain absolute consistency with the Building Code Act, the model energy code would allow the same level of flexibility. That is, a municipality could adopt portions of the IECC and could modify portions of the IECC as long as it did not adopt an alternative energy code in its entirety.²⁴

IV. MAINE MODEL ENERGY CODE

Although the Legislature has charged the Commission with establishing a model building energy code, existing statutes would seem to limit the Commission's discretion with respect to those aspects of the code set forth below. In Section V, we seek comments on whether we are interpreting those statutes correctly.

²² The term "voluntary" does not mean that an individual builder or homeowner may choose whether to comply with codes. A municipality decides which codes to adopt (if any) and all construction within that municipality must conform to the codes chosen.

²³ See Section 9702 of Title 10.

²⁴ Decisions regarding amendments to standards, and enforcement of adopted standards, are currently carried out locally. Absent legislation, this administrative model would continue unchanged.

Aspects explicitly required by law:

- Energy standards: The IECC (or ASHRAE 90.1-2001) shall be the energy code for commercial and institutional buildings.
- Ventilation standards: ASHRAE 62-2001 shall be the ventilation standard for commercial and institutional buildings.
- Adoption authority: Each municipality shall choose whether to adopt an energy code, but if a municipality adopts an energy code, it must be the Maine model energy code established through the Commission's proceeding. Standards need not be followed in municipalities that choose not to adopt them.
- Grandfathering: A municipality that has already adopted an energy standard may retain that standard.

Aspects implicitly required by law:

- Energy standards: The IECC shall be the energy code for residential and industrial buildings (as an exception, publicly subsidized, multifamily, electrically heated housing shall conform to building envelope standards explicitly stated in Maine law).
- Types of residential housing: The model energy code shall apply to all residential "stick-built" construction, with the exception of certain unheated structures as defined in the IECC standards. The Commission requires additional information regarding appropriate energy codes for manufactured (including modular) housing.
- Renovations and additions: The model energy code shall apply to all renovations and additions to existing buildings.
- Adopting the standards: A municipality may adopt only portions of the energy standards, and may revise portions as long as the revision does not result in adoption of another standard altogether.

V. QUESTIONS

We ask interested persons to submit written answers to the following questions, which address the issues and questions discussed in earlier sections of this Notice. As a general matter, we seek input on whether the law clearly establishes the outcomes we discuss in the previous Section, whether there are aspects of the codes over which we can exercise discretion, and if so, how those aspects should be decided.

A. Appropriate Standards

1. To satisfy the consistency requirements of the law, should the IECC be adopted in Maine? Do the IECC standards conflict with any existing building standards adopted in law or through other means? If so, how can the conflict best be resolved?

2. Should the ASHRAE 62.2-2003 ventilation standards be adopted for residential buildings? Will these ventilation standards adequately protect the quality of indoor air when combined with the IECC energy efficiency requirements? If not, how can indoor air quality be guaranteed? Do these standards conflict with any portions of the IECC? If so, how can the conflict best be resolved?

3. Should the ASHRAE 62-2001 ventilation standards be adopted for industrial buildings?

B. Applicability

4. To satisfy the consistency requirements of the Energy Code Act, should energy codes apply to all residential new construction? If not, to what types of residential housing (e.g., owner-constructed dwellings, spec-built homes, etc) should they apply?

5. To satisfy the consistency requirements of the Energy Code Act, should energy codes apply to alterations and additions to residential buildings? If not, to what types of alterations and additions should they apply?

6. Should the IECC apply to modular and manufactured housing? If not, what codes should apply and to what extent are they consistent with the IECC?

7. Should the envelope standards of the IECC apply to publicly subsidized, multifamily, electrically heated housing (which would require a change to Maine law)?

8. Is the Commission's interpretation correct that the IECC does not apply to a change in building occupancy?

9. To satisfy the consistency requirements of the law, should energy codes apply to industrial buildings?

C. Voluntary vs. Mandatory Standards

10. To satisfy the consistency requirements of the law, should municipalities be allowed to adopt portions of the model residential building energy code or revise portions of the code?

D. Other

11. To what extent will the adoption of the model energy code described in this Notice add to the initial construction costs of residential and

commercial buildings in Maine? To what extent will adoption reduce the cost of energy used by residential and commercial buildings in Maine?

12. Please submit any other comments that will help the Commission establish an effective, workable Maine model building energy code pursuant to the Energy Code Act.

VI. SCHEDULE FOR THIS INQUIRY

The Commission requests that written comments be filed no later than June 4, 2004. Comments should be submitted electronically by going to the Commission's web site (www.state.me.us/mpuc) and following the electronic filing instructions.²⁵ All comments will appear on the Virtual Case File section of the web site. Filings should refer to Docket No. 2004-260.

The Commission staff will hold a technical conference on the questions posed in this Notice on June 17th at 9:30 a.m., in the Commission's headquarters at 242 State Street, Augusta. Upon review of the written and oral comments, the Commission will determine the next steps to take in this Inquiry.

The Commission will notify all persons who file comments of meetings or other activities that occur in this Inquiry, and will post notice of its next steps on the Commission web page at <http://www.state.me.us/mpuc/buildingcodes.htm>. Following the Inquiry, the Commission will initiate a rulemaking to establish the major substantive rule required by the Building Code Act.

VII. SERVICE OF NOTICE

A copy of this Notice shall be provided to all persons of whom the Commission is aware who have participated in legislative or regulatory energy efficiency construction activities within the State, and the Commission will notify members of Maine's building community through any means of which it is aware. The Notice will be posted on the Commission's web page.

Dated at Augusta, Maine, this 14th day of May, 2004.

BY ORDER OF THE COMMISSION

Dennis L. Keschl
Administrative Director

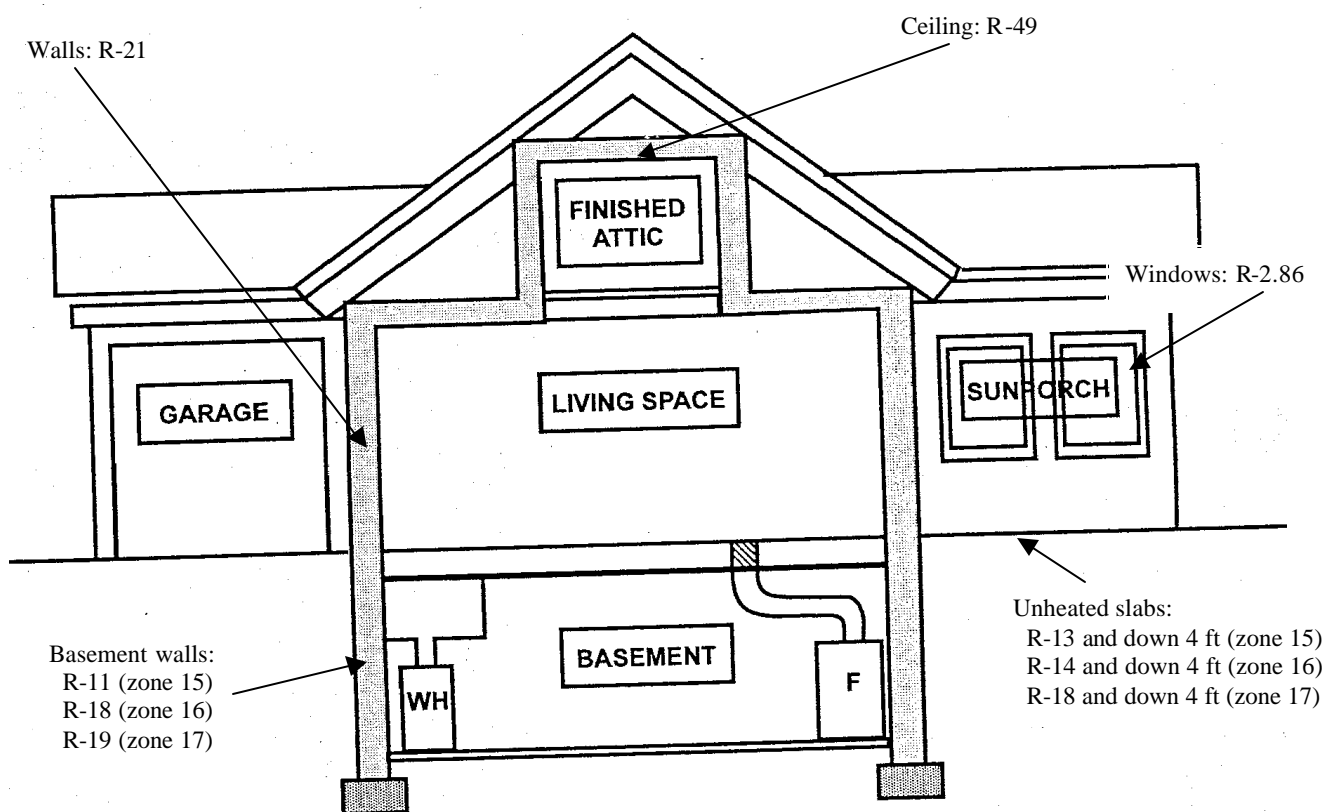
²⁵ Persons without electronic access may mail comments to Administrative Director, Maine Public Utilities Commission, 242 State Street, State House Station 18, Augusta, ME 04333.

COMMISSIONERS VOTING FOR: Welch
Diamond
Reishus

Appendix 1 Simplified Features of the IECC

The following two charts describe the basic features of the IECC codes. Charts showing the Maine climate zones and a sample of heating degree days are in Appendix 2.

IECC Minimum Thermal Performance for Maine Locations



Vapor retarder installed on the warm-in-winter side with 1 perm rating

Air leakage:

Windows: .3 cfm/ft² of window area
 Sliding Doors: .3 cfm/ft² of door area
 Swinging Doors: .5 cfm/ft² of door area

Duct Insulation:

	<7500 HDD	>7500 HDD
Supply duct:	R-8	R-11
Return Duct:	R-4	R-6

Floors over unconditioned space
 or unfinished basement: R-21

Appendix 1 (continued)
Simplified Features of the IECC

Minimum Thermal Performance (U-factor and R-value)							
Climate Zone	Maximum	Minimum					
	Glazing (U)	Ceiling (R)	Wall (R)	Floor (R)	Basement wall (R)	Slab (R) & depth	Crawl Space (R)
15	0.35	R-49	R-21	R-21	R-11	R-13 & 4 ft	R-20
16	0.35	R-49	R-21	R-21	R-18	R-14 & 4 ft	R-20
17	0.35	R-49	R-21	R-21	R-19	R-18 & 4 ft	R-20

Steel-frame Wall Minimum R-values	
Wall Cavity and Sheathing R-value	
15	R-13 + R-10
16	R-19 + R-9
17	R-25 + R-8

Mass Wall Assembly R-values	
	Exterior or Integral Insulation
15	R-15.5
16 & 17	R-18.4
	Interior insulation
15	R-18.4
16 & 17	R-18.4

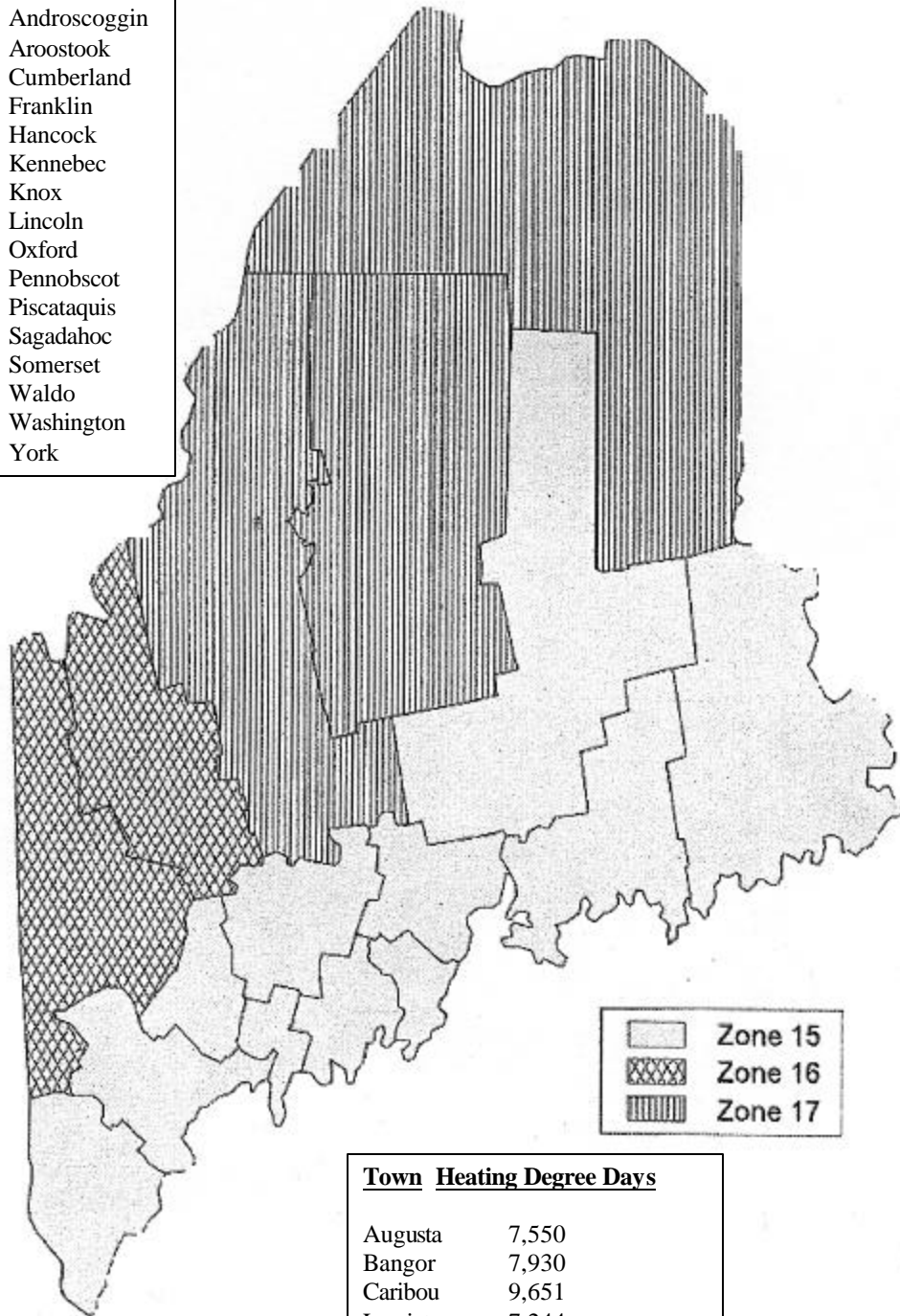
Minimum Pipe insulation					
Insulation Thickness (R=4/inch)					
Heating system	Pipe size:	<1-1"	1.25-2"	2.5- 4"	5" or larger
	fluid temp				
low temp H ₂ O	106-200	1	1	1.5	1.5
Low pressure steam	201-250	1.5	1.5	2	2
Medium pressure	251-305	1.5	2	2.5	3
High Pressure	306-450	2.5	2.5	3	3.5
Steam Condensate (Feed water)		1	1.5	2	2




Minimum Duct Insulation		
	<7500 HDD	> 7500 HDD
Supply Duct	R-8	R-11
Return Duct	R-4	R-6

Appendix 2

Zones and Heating Degree Days for Locations in Maine

<u>Zone</u>	<u>County</u>
15	Androscoggin
17	Aroostook
15	Cumberland
16	Franklin
15	Hancock
15	Kennebec
15	Knox
15	Lincoln
16	Oxford
15	Pennobscot
17	Piscataquis
15	Sagadahoc
17	Somerset
15	Waldo
15	Washington
15	York



	Zone 15
	Zone 16
	Zone 17

Town Heating Degree Days

Augusta	7,550
Bangor	7,930
Caribou	9,651
Lewiston	7,244
Millinocket	8,902
Portland	7,378

NOTICE OF RIGHTS TO REVIEW OR APPEAL

5 M.R.S.A. § 9061 requires the Public Utilities Commission to give each party to an adjudicatory proceeding written notice of the party's rights to review or appeal of its decision made at the conclusion of the adjudicatory proceeding. The methods of review or appeal of PUC decisions at the conclusion of an adjudicatory proceeding are as follows:

1. Reconsideration of the Commission's Order may be requested under Section 1004 of the Commission's Rules of Practice and Procedure (65-407 C.M.R.110) within 20 days of the date of the Order by filing a petition with the Commission stating the grounds upon which reconsideration is sought.
2. Appeal of a final decision of the Commission may be taken to the Law Court by filing, within **21 days** of the date of the Order, a Notice of Appeal with the Administrative Director of the Commission, pursuant to 35-A M.R.S.A. § 1320(1)-(4) and the Maine Rules of Appellate Procedure.
3. Additional court review of constitutional issues or issues involving the justness or reasonableness of rates may be had by the filing of an appeal with the Law Court, pursuant to 35-A M.R.S.A. § 1320(5).

Note: The attachment of this Notice to a document does not indicate the Commission's view that the particular document may be subject to review or appeal. Similarly, the failure of the Commission to attach a copy of this Notice to a document does not indicate the Commission's view that the document is not subject to review or appeal.